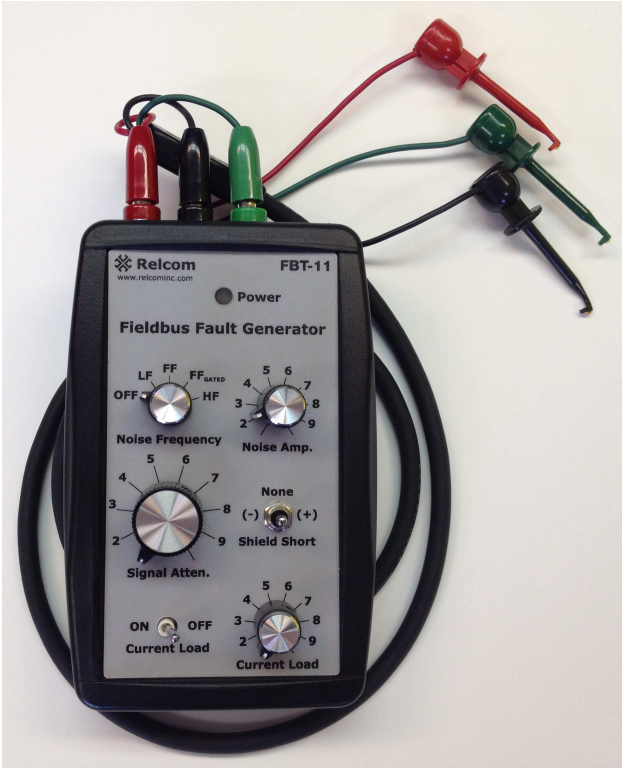
FBT-11

Fieldbus Fault Generator

User Manual



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II. Introduction

The FBT-11 Fieldbus Fault Generator is a Foundation Fieldbus physical segment tool designed to test the susceptibility of a segment to various faults that may occur in the field. It allows both engineering and service technicians to determine the health of fieldbus segments.

This manual was current at the time of printing. Go to www.relcominc.com for an electronic copy of the latest version of this manual. Further information on fieldbus is available in the Fieldbus Wiring Guide, also available on the website.

Summary of Features

The Fault Generator includes the following features:

- Places variable frequency and amplitude noise onto the bus
- Attenuates bus signals
- Simulates the current draw of adding up to 5 standard 20mA Fieldbus devices on a segment
- Causes shield shorts to the positive and negative Fieldbus lines

VIII. Revision History

Revision	Date	Description
A	05/21/2012	Original Release

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VII. Warranty

Relcom, Inc. warrants the FBT-11 to perform as described in this manual under normal use for a period of one year after delivery to the original purchaser. This warranty does not apply if the Fault Generator has been disassembled, modified or used for purposes other than those described in this manual.

Upon verification of any defect, Relcom, Inc. shall, at its option, repair or replace the defective unit.

In no event does Relcom, Inc. assume liability for incidental or consequential damages. This warranty is the extent of the obligation or liability assumed by Relcom, Inc., and no other warranty or guarantee is either expressed or implied.

Relcom, Inc. reserves the right to make design changes to the FBT-11 without notice and with no obligation to make the same or similar changes to units previously manufactured.

Relcom, Inc. has made every effort to assure the accuracy of the information contained in this manual. Relcom is not, however, responsible for any errors or omissions. Please contact us with any questions or suggestions.

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III. Operation

The Fault Generator draws a minimum of 14mA of current from the fieldbus segment it is connected to. Verify adequate current is available before connecting the Fault Generator or bus communications may be impacted.

Startup

The Fault Generator is powered by the segment it is connected to and turns on automatically. Begin by connecting the color coded leads to both the FBT-11 as well as the fieldbus segment you wish to test. If connected correctly, a green “Power” LED will illuminate, signifying the segment is device is ready to use. To ensure the segment is affected as little as possible upon power-up, set the controls of the device as follows:

Noise Frequency: OFF
Current Load: 1
Signal Atten.: 1
Shield Short: None
Current Load: OFF
Noise Amp.: 10

The input of the Fault Generator is reverse polarity and fuse protected.

Inducing Bus Noise

Sinusoidal noise may be introduced onto the bus by selecting one of four settings on the “Noise Frequency” dial. Changing the setting on this dial changes the frequency and type of noise on the bus. See table 1 for details.

Setting	Frequency	Noise Type
OFF	N/A	None
LF	500 Hz	Constant Sinusoidal
FF	20 kHz	Constant Sinusoidal
FF_{gated}	20 kHz	Pulsed Sinusoidal
HF	200 kHz	Constant Sinusoidal

Table 1

Noise may be introduced at one of three frequencies: 500Hz, 20kHz, and 200kHz. The FF_{gated} signal places 20kHz noise on the bus in a 5ms on, 390ms off pattern.

The amplitude of the noise is controlled by the “Noise Amp.” dial. When set to “1”, no noise is introduced onto the bus. Setting the dial to “10” will introduce the maximum level of noise onto the bus.

When introducing noise at either 500 Hz or 200 kHz, a robust fieldbus should be able to withstand 200mV of noise without dropping devices. The specific level of noise on the bus can be verified using an oscilloscope or a fieldbus measurement device such as the FBT-6. Table 2 shows the measurement noise ranges for the FBT-6

Low Frequency Band	50Hz to 4KHz
Fieldbus Frequency Band	9KHz to 40KHz
High Frequency Band	90KHz to 350KHz

Table 2

When introducing noise at 20 kHz, which lies in the fieldbus frequency range, devices will begin to drop from the segment as the noise is increased. If the noise is increased to a high enough level, the FBT-6 will be unable to distinguish proper fieldbus signals from noise, and will cease decoding. 20kHz noise may also cause a large number of retransmits. This noise may even distort proper fieldbus signals enough so that the DCS or FBT-6 will detect “phantom” devices, or devices that do not exist but show up on a device list.

It is recommended to set the “Signal Atten.” dial to “1” and the “Shield Short” switch to “None” while using the bus noise feature to obtain the best results.

VI. Service

The Fault Generator does not contain any user serviceable parts. All adjustments and/or repairs have to be performed at the factory. If the FBT-11 needs to be serviced, return it to Relcom, Inc. If the Fault Generator is still under warranty, the repairs or replacement will be made free of charge. For service outside the warranty, please call or write before sending the Fault Generator to determine the charges for the service. All devices sent to Relcom, regardless of warranty status, must have an RMA issued before being shipped. An RMA can be obtained by contacting Relcom.

Specifications

V. Specifications

Input Voltage:	9.5 to 32 VDC
Max. Input Current: (Current Load Off) (Current Load Max)	 33mA 143mA
Max Power Dissipation: (Current Load Off) (Current Load Max)	 1.06 W max (@ 32 VDC) 4.58W max (@ 32 VDC)
Operating Temperature:	0 to +35℃
Dimensions:	146 x 88 x 28 mm (5.7 x 3.5 x 1.1in.)
Weight:	0.18kg (0.4lb.)
Case material:	ABS
LF Noise Frequency:	500 Hz
LF Noise Amplitude	0mVpp – 1000mVpp ± 100mV
FF Noise Frequency:	20 kHz
FF Noise Amplitude	0mVpp – 925mVpp ± 65mV
HF Noise Frequency:	200 kHz
HF Noise Amplitude	0mVpp – 625mVpp ± 25mV
Current Load Range:	Min: 18mA ± 2mA Max: 100mA ± 10mA
Signal Attenuation Max:	50% (At 20kHz)

The Fault Generator is powered by the Fieldbus and draws at least 14 mA of current from the segment (depending on bus voltage, device settings, and ambient temperature).

Specifications subject to change without notice.

Operation

Internal Current Load

The fault generator has an internal, high impedance current sink that can simulate the increased current draw of adding up to 5 fieldbus devices to a bus.

To turn on the current load, flip the “Current Load” switch to the “ON” position. The amount of current drawn by the load is varied by turning the “Current Load” dial. Setting the dial at “1” causes a draw of about 18mA. The current sink level can be increased up to “10”, which draws about 100mA. The amount of current taken by the load varies linearly as the dial is turned.

Care should be taken when using the internal current load, as increasing the load too much may overload a fieldbus power supply. It is recommended to verify the maximum current output of the power supply being used before using the current load function.

The current load function may be used in combination with any of the other functions of the Fault Generator.

Shield Short

The Fault Generator’s shield short function allows the user to cause shorts from either the positive or negative fieldbus lines to the shield.

To cause a short between the shield and positive fieldbus line, move the “Shield Short” switch to “+”. To cause a short between the shield and negative fieldbus line, move the “Shield Short” switch to “-“.

The shield short function may be used in conjunction with any of the other Fault Generator functions.

Signal Attenuation

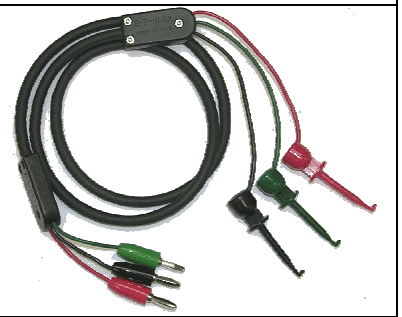
The fault generator makes it possible to attenuate the signal being sent on a fieldbus segment. The FBT-11 can attenuate fieldbus signals from 0% to 50% of the signal's original level (at 20kHz).

To attenuate fieldbus signals, rotate the "Signal Atten." knob to the right. At a setting of "1", the Fault Generator provides no attenuation to the fieldbus signal. At a setting of "10", the Fault Generator attenuates the signal by 50%.

To test this function on a non-communicating fieldbus, first set the "Signal Atten." to "1", the "Noise Frequency" to "HF", and the "Noise Amp." to "10". Using an oscilloscope or an FBT-6, it should be visible that there is a signal on the bus. Slowly rotate the "Signal Atten." knob to the right. The level of the signal on the bus should begin to decrease as the knob is rotated. Returning the knob to "1" will return the signal of its original level.

Note: The bus signal attenuation does not change linearly as the knob is turned.

IV. Accessories

Part Number	Description	Picture
FBT-A61	FBT-6 Fieldbus Cable with Mini-Hook Probes	
FBT-A63	FBT-6 Fieldbus Cable with Clip-on Probe	
FBT-A64	Clip-on Probe	

Contact Relcom directly for pricing and availability.

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(or call 1-503-357-5607)